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EXAMINER

CREPEAU, JONATHAN

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/054,213
Filing Date: November 13, 2001
Appellant(s): STIMMING ET AL.

Alfred W. Froebrich
For Appellant

EXAMINER'S ANSWER

This is in response to the supplemental appeal brief filed September 11, 2006 appealing from the Office action mailed September 23, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

GROUND OF REJECTION NOT ON REVIEW

Art Unit: 1745

The following grounds of rejection have not been withdrawn by the examiner, but they are not under review on appeal because they have not been presented for review in the appellant's brief.

Rejection of claims 12 and 13 under 35 U.S.C. 103(a) over Wilkinson et al.

Rejection of claims 6, 7 and 9 under 35 U.S.C. 103(a) over Wilkinson et al. in view of Appellants' admission of prior art.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,096,448	WILKINSON et al.	8-2000
Fedkiw, et al.	<i>J. Electrochem Soc.</i>	10-1988

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 8, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilkinson et al (U.S. Patent 6,096,448). Wilkinson is directed to methods of momentarily fuel starving an anode of a PEM fuel cell. Fuel starving is defined by Wilkinson as a rise in the

Art Unit: 1745

anode voltage (see col. 6, line 20). The starvation is performed by one of three methods: halting the fuel supply, introducing pulses of a non-reactant into the reactant stream, or connecting a transient load (see col. 3, lines 18 and 36; col. 4, line 23). Each of these methods would “impress” a positive voltage pulse on the anode. As shown in Figure 8, the voltage of the fuel cell does not change sign when the anode is fuel starved. Regarding claims 4, 5, and 8, the fuel cell may operate on reformed hydrocarbons, reformed methanol, or direct methanol (see col. 1, line 66, col. 2, line 27). Regarding claims 10 and 11, the extent to which the anode is fuel starved is controlled so that the fuel cell does not undergo cell reversal (see col. 7, line 21).

It is further noted that “means for impressing a positive voltage pulse on the anode” recited in claim 1 is considered to invoke 35 USC §112, sixth paragraph, whereas “the step of impressing” in claim 2 is *not* considered to invoke such (see MPEP §2181). Therefore, regarding claim 1, as the methods of Wilkinson achieve a momentary rise in the anode voltage, just as the methods disclosed in the instant specification do, the methods of Wilkinson are considered to be equivalents of the methods of the instant specification. As such, Wilkinson is anticipatory of claim 1. See MPEP §2183.

(10) Response to Argument

With regard to the Wilkinson reference, Appellants assert that the reference does not teach the step of “impressing a positive voltage pulse on the anode” as called for in the claims. Appellants state that the step of causing fuel starvation “can not be considered read on this language” (brief, page 5) but do not offer further support for this argument. It is the Office’s

Art Unit: 1745

position that the disclosure of Wilkinson reads on the claim language for the following reasons.

As stated in the rejection above, the “means for impressing a positive voltage pulse on the anode” recited in claim 1 is considered to invoke 35 USC §112, sixth paragraph, whereas the “step of impressing” in claim 2 is *not* considered to invoke such, pursuant to MPEP §2181.

Appellants do not seem to dispute this interpretation of the language in claims 1 and 2. The disclosure of Wilkinson is directed to three methods of causing the anode voltage to rise momentarily: interruption of the fuel supply (col. 3, line 32), periodic introduction of substantially fuel-free fluid (col. 3, line 36), and periodic connection of a transient load to draw power from the fuel cell (col. 4, line 23). It is submitted that each of these methods reads on, and is anticipatory of, the language in claim 2 reciting a “step of impressing at least one positive voltage pulse on the anode.” The claim language does not specify exactly *how* the voltage pulse is impressed, i.e., the source of the pulse, how it is generated, etc. As such, it is submitted that any of the three methods disclosed by Wilkinson reads on the language of “impressing” a voltage pulse on the anode since the voltage pulse in Wilkinson is forcibly applied onto the anode.

With regard to claim 1, the “means for impressing a positive voltage pulse on the anode” is considered to invoke 35 USC §112, sixth paragraph as stated above. The Office submits the following analysis with regard to how the Wilkinson reference meets the means-plus-function language of claim 1. First, it is noted that MPEP 2183 states the following:

If the examiner finds that a prior art element

- (A) performs the function specified in the claim,
- (B) is not excluded by any explicit definition provided in the specification for an equivalent, and
- (C) is an equivalent of the means- (or step-) plus-function limitation, the examiner should provide an explanation and rationale in the Office action as to why the prior art element is an equivalent.

Art Unit: 1745

As noted above, the three elements of Wilkinson perform the function specified in the claim (“impressing a positive voltage pulse on the anode”). Thus, criterion (A) is met. Further, the prior art elements are not excluded by any explicit definition provided in the specification, thereby meeting criterion (B). Regarding criterion (C), Appellants state on page 3 of the Appeal Brief, “[a] specific example of the means for impressing a positive voltage pulse is shown in Fig. 1 and includes a signal generator 5 and a MOSFET (page 7, lines 3-4).” In addition, the Office notes that page 4, fourth paragraph of the instant specification discloses the following:

[0015] To produce a suitable positive voltage pulse, means which produce a temporary short circuit between the anode and cathode are provided for example. Alternatively, means which bring about a pulsed feeding in of external electrical energy, which is supplied to the anode, are provided. In both cases, short current or voltage pulses are produced and impressed on the anode. The pulse may in principle be of any desired shape. The variant first described, with the short circuit, has the advantage over the feeding in of external energy in that there is no need for an external energy source.

Thus, it is seen that Appellants contemplate, as corresponding to the claimed means, an apparatus for providing a short circuit as well as an apparatus for feeding in external energy. As further stated in MPEP 2183 with regard to criterion (C):

Factors that will support a conclusion that the prior art element is an equivalent are:

(B) a person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding element disclosed in the specification.

In this case, it is the Office’s position that a skilled artisan would have recognized the interchangeability of the elements shown in the prior art for the corresponding elements disclosed in the specification. In Wilkinson, the purpose of the fuel starving is to remove electrocatalyst poisons (see abstract). The purpose of the elements disclosed in the instant specification is to improve fuel cell power by “oxidation of the carbon monoxide adsorbed at the catalyst” (specification, page 4, third paragraph). Thus, the purpose of the elements of

Art Unit: 1745

Wilkinson and the purpose of the elements of the instant specification are identical. The skilled artisan would recognize that although Wilkinson produces a voltage pulse by fuel starving, a voltage pulse could be just as easily generated by an external source and supplied to the fuel cell, as disclosed in the instant specification. As evidence of this interchangeability, the disclosure of Fedkiw et al (*J. Electrochem Soc.*, 1988) is cited. In the abstract, this reference discloses that “[a] periodic, pulsed-potential control strategy was examined as a means to regenerate *in situ* a platinum electrode which was otherwise poisoned by methanol oxidation.” Thus, a person skilled in art at the time of the filing of the instant application would have been aware of this disclosure and thus would have considered the pulsed-potential control disclosed by Fedkiw as being equivalent to the fuel starving disclosed by Wilkinson because both achieve the same purpose. In remarks filed March 21, 2006, Appellants state that “[a]lthough the fuel starvation at the anode achieves the same results as the claimed invention, i.e., an increase in the anode potential, Wilkinson achieves the result using an entirely different solution.” Thus, Appellants also acknowledge the similarity of purpose between Wilkinson and the claimed invention. The Examiner concurs that the fuel starvation of Wilkinson is a different solution than that disclosed by Appellants, but it is the Examiner’s position that the fuel starvation elements of Wilkinson are substantially equivalent to the voltage pulsing or short-circuiting elements of the instant specification. Therefore, under 35 USC 112, sixth paragraph, the disclosure of Wilkinson is sufficient to anticipate the claimed means-plus-function limitation.

Appellants offer a further argument that “Wilkinson raises the anode potential without the need for means for impressing a positive voltage pulse.” Here, Appellants are apparently interpreting the claimed means as corresponding to the external voltage pulses disclosed in the

Art Unit: 1745

specification. However, it is noted that Appellants also disclose an element for short circuiting the fuel cell. As disclosed in the specification at page 4, fourth paragraph, the element for short-circuiting “has the advantage over the feeding in of external energy in that there is no need for an external energy source” (emphasis added). Thus, Appellant’s argument that “Wilkinson raises the anode potential without the need for means for impressing a positive voltage pulse” is not persuasive because the claimed means does not necessarily correspond to an extra element that must be present, i.e., an external voltage source.

In addition, although Appellants did not present arguments in the Appeal Brief relating to the support of the claimed subject matter in the parent application, the Examiner submits the following arguments relating to this issue in the event Appellants should file such arguments in a subsequent reply brief. Otherwise, the Board may disregard the following paragraph.

Appellants state in remarks filed July 19, 2005 that the presently claimed subject matter is supported by the certified translation of the international application (filed as the specification of the parent application) and also the foreign priority document, thereby antedating the Wilkinson reference. However, these arguments are not found persuasive. Appellants state that “[a]lthough the original application did not expressly include the formula recited in the claims, the examples cited in the specification teach those skilled in the art the parameters defined by the formula.” However, it is the Examiner’s position that the examples, which include parameters that *may* fall within the presently claimed formula, are still not sufficient to show possession of the claimed invention as a whole. Specifically, Appellants rely upon a previously referenced article that is characterized in the response of July 19, 2005 as teaching that “the ideal voltage is known by those skilled in the art to be greater than 1 volt (approximately 1.2 volts).” Thus,

Art Unit: 1745

Appellants appear to be stating that a skilled person would recognize that fuel cell of the present invention normally operates at greater than 1 volt. However, in the previous response, in a discussion of the prior art, Appellants characterized the same article as teaching that “the operating voltage is typically more than .2 volts less than the equilibrium” and further that “the operating voltage decreases as the current density increases and is typically in the range of 0.5 to 1.0V.” As such, Applicant’s characterization of the article between the response of July 19, 2005 and the response prior to that appears to be inconsistent. The Examiner previously concurred with the first characterization and as a result, withdrew the prior art rejection over Fedkiw. Now, applying the same standard to the specification of the parent application, it cannot be said that the article supports a skilled person’s interpretation that the inventive fuel cell necessarily operates at a voltage of greater than 1 volt. As such, the recitation in claim 1 that “the fuel cell has a voltage that does not change sign and at most becomes zero” is still not believed to be supported by the parent application.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

Art Unit: 1745

Respectfully submitted,



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